Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

NOTES ON COLLECTING CICINDELIDÆ.

By D. E. LANTZ, Biological Survey, Washington, D. C.

Read before the Academy, at Manhattan, November 28, 1903.

DURING the past two or three years, in going about the state, I have spent some leisure hours in collecting insects for the department of zoology in the State Agricultural College. The great beauty of most of the representatives of the family of Cicindelidæ attracted my special attention to them, and I began to form a private collection of them. In addition to the varieties and species found in Kansas, I have collected several in Colorado, and have done some exchanging. My experience in the field has given me a fair knowledge of the habits and special characteristics of the species that have come under my notice, and I have found some new localities for some of them. With the expectation that some of the members of the Academy may be interested, I have ventured to present a few notes of my observations of this interesting family.

Amblychila cylindriformis Say. Taken near Wallace, July 8, 9, 10, and 24, and August 4 and 5, 1902. A few specimens were found on the open prairie at a considerable distance from the clay banks on which they are usually found. A single specimen was found August 24, 1902, on the embankment of an irrigation ditch near Bent's Fort, Bent county, Colorado. I found this insect feeding most commonly on the mounds of the Occident ant (Pogonomyrmex occidentalis). It may be of interest to mention that Dr. Walther Horn, of Berlin, has recently described a new North American Amblychila, calling it Am. swartzi, thus recognizing four forms—cylindriformis, baroni, piccolominii, and swartzi.

Tetracha virginica Linn. Occurs at Manhattan in June, July, and August. Taken by me only in July, 1902. The notable scarcity of this species during the past season in the Kansas valley may be attributed to the June floods.

Dromochorus belfragei Salle. Previous to 1902 this insect was regarded as rare in the vicinity of Manhattan, the annual catch by college collectors being confined to a few individuals each season. In 1902 it was abundant over a limited area southeast of town on the hills. It was first observed June 15, by Mr. Charles Popenoe, who captured a single specimen. On the following day I went with him to the same locality and we succeeded in finding nearly fifty specimens. They were afterward taken plentifully on various days up to about August 15. In all, six collectors took about a thousand of them. During the season just ended, a careful outlook was kept for this species but no representatives were discovered earlier than July 2, and the total catch at Manhattan did not exceed six. I took a single specimen at Alma. My observations do not confirm the statement that this insect is crepuscular in its habits. It seemed to be abundant at all hours in which I looked for it, which were from nine A. M. to five P. M. The great majority of the specimens captured were taken between two and five o'clock. The presence or absence of sunlight did not seem to affect their numbers, and they did not hide or disappear during a sudden shower of rain. Early in the season, they were found near the tops of the hills; later, farther down the slopes; and when the dry August weather prevailed, they came down to the moist watercourses in the valleys.

Cicindela celeripes Lec. About a dozen years ago Professor Popenoe found this species common at Manhattan and in Clay county. Since then none had been collected until the season of 1902. I found the species near Junction City, on the Fort Riley military reservation, on May 23, 1902, and captured twenty-five specimens. They seemed to have just emerged, and were confined to a space of four or five square rods. On June 6, I found them more abundant at the same place and also more widely distributed. A few days afterward I found them about four miles south of Manhattan, in the sand hills. They were abundant at this place and college collectors afterward captured large series. Later other localities were found and they continued common during the month of July. In 1903 a few specimens were seen east of town on May 25, but the inundation which followed covered all of the localities in which this species was taken in 1902 except one. I was subsequently very much surprised to find the insect abundant on top of the hills southwest of Manhattan. I also found a few at the side of the railroad tracks in the south part of town, at a place not reached by the earlier flood. Although this species cannot fly, it is very difficult to capture until one learns how by actual experience. It is a very swift ruuner and an artful dodger. I take it by placing the left hand quickly directly in its way, and as it runs up over the palm, I grasp it with the thumb and first finger of the right. Dr. Walther Horn has announced* the discovery of a specific difference between this species and the variety cursitans. He finds it in the sparse white bristles on the elytra in celeripes which are lacking in cursitans. I find, however, that in looking over a large series of those taken here, there are all degrees of pilosity, and in about half the specimens no evidence at all of such bristles on the elytra. I conclude that this character would be of no use in the determination of any but fresh specimens.

---

*Deutsche Entomol Zeitung.

C. longilabris var. laurentii Schaupp. Taken by me at Leadville, Colo., on flats west of town, July 24, 1903. I found it associated with C. cimarrona, and found both species equally hard to capture. This may have been partly because of the strong wind that was blowing, but my experience is that they were exceedingly wary and hard to approach. I saw a single specimen of laurentii at Victor, Colo, on July 31. Altitude of both localities is about 10,000 feet.

C. obsoleta Say. Two specimens taken near Bent's Fort, Colo., August 23, 1902; one at Las Animas two days later; one at Las Animas, July 13, 1903; two at La Junta, August 3; ten at Syracuse, Kan., August 4; ten at the same place, August 27. Of these only three showed any sign of maculation.

C. obsoleta var. prasina Lec. Three taken at Syracuse, Kan., August 4, and twenty at the same place, August 27, 1903. All immaculate except one. Associated with obsoleta, from which it does not differ except in color. The flight of these two insects is quite slow, but often very much prolonged. They are easy of capture, especially at the moment of rising.

C. scutellaris Say. Common on sandy soil throughout the state. In the eastern half of the state the specimens have a distinct green suffusion near the base of the elytra, but this becomes less prominent as we go westward, and is entirely lacking in specimens from beyond the middle of the state. The western specimens are of the typical form. Those from eastern Kansas are also very often spotted and sometimes approach variety lecontei in color. A single Manhattan specimen closely resembles var. rugifrons. Found in the spring and fall; rare in midsummer. I have taken this species at Manhattan, Topeka, Medora, Meade, Morland, Ellis, Junction City, Ellsworth, and Grainfield, Kan.; at Superior, Benkelman, and Haigler, Neb.; also at Wray, Colo.

C. nigrocœrulea Lec. In August, 1902, I accompanied Mr. Warren Knaus to Bent's Fort, Colo., in search of this species. We found it common in suitable localities at this place and also at Las Animas, in the same county. We captured over a hundred specimens on the trip. We found blue-black and green forms associated together and pairing indiscriminately, thus proving the practical identity of nigrocœrulea and robusta Leng. The captures were August 23–25. A few days later Eugene Smyth found two specimens of this insect just east of the Colorado line, near Coolidge, Kan., thus being the first to add it to the state list. In 1903 I took nine specimens at Las Animas, July 13, and nearly a hundred at La Junta, August 3. At Syracuse, Kan., I took five on August 4, and ten on August 27. This species is found on damp soil on bare spots in pastures and in alfalfa-fields. I also found it in irrigated sugar-beet fields, along the borders of alkali spots where plants were missing. It flies much more slowly than C. punctulata and its variety micans, both of which inhabit similar places, and the latter of which the green form closely resembles. Its flight is also much longer than that of micans. It rises almost perpendicularly to the height of three or four feet and then goes out horizontally, much after the manner of C. obsoleta, but of course not so far.

C. pulchra Say. I first took this species at Meade, Kan., May 15, 1902, taking sixteen specimens. Common at Lakin, June 13; at Wallace, July 8-10; August 4, at Wallace, several dead ones were seen and one battered live specimen. I concluded that this was the end of the season; but later, August 25, I found several apparently fresh specimens at Las Animas, Colo. At Oakley, Kan., I took a fresh specimen September 15, and, the present season, one at Grainfield on September 25. I conclude that there is a second brood of this species, not so numerous as the first. The species is found in Colorado in the Arkansas valley as far west as Salida.

C. sexguttata var. violacea Fab. The true relation of violacea to the type is not well defined. The original description as well as Schaupp's definition would fix all immaculate specimens as variety violacea. Leng, on the other hand, confines that variety to the rare form which is entirely violet in color. Both these seem to me to be extreme views. An examination and comparison of specimens from various parts of the country shows that the Western forms have legs uniformly violet, while the Eastern and Southern ones have green legs. Immaculate individuals are common both in the East and the West. So also are individuals with one, two, three or even four spots on each elytron. Of course a larger proportion of the specimens in the West are immaculate, but the violet form mentioned by Leng has a large proportion of the individuals spotted. The original description would not apply to them. I am inclined to place all Kansas specimens under the variety violacea, on the ground of the color of the legs and without regard to maculation. This insect appears at Manhattan about May 15, and remains until about August 20. It is abundant. The bright violet form is found at Manhattan, Topeka, Alma, and Onaga. No doubt there are other good localities for it in the state.

C. purpurea Oliv. Occasional at Manhattan. More common both to the east and west where the country is less broken. Westward it gradually grades into the variety graminea. While it occurs here in company with both vulgaris and splendida, the association seems to me to be an accidental one. No evidence of hybridism with splendida has been observed. Taken in April, May, September, and October.

C. purpurea var. audubonii Lec. Found abundantly over the western half of the state in spring and fall, and occasionally on warm days in winter. It evidently hibernates. Taken by me at Ellsworth, Hays, Ellis, Wa Keeney, Grainfield, Oakley, Dodge City, Meade, Goodland, and Colby, Kan.; at Benkelman, Neb.; at Colorado Springs and Limon, Colo.

C. purpurea var. graminea Schaupp. Found associated with purpurea and audubonii, and taken on the same dates and in the same localities as the latter. The specimens taken in Colorado and westward differ much in shape from those taken further east.

C. purpurea var. cimarrona Lec. Taken at Leadville, Colo., July 24, and at Victor, Colo., July 31, 1903. Only a few seen, associated with C. laurentii. I have already spoken of my difficulty in taking this species.

C. splendida Hentz. Occurs in spring and fall and on warm days in winter. I have found them in midwinter by excavating their burrows, and have taken considerable numbers in this way. A few may be found in favorable places in midsummer, so that, in a few successive years, one could have records of their capture in every month of the year. I have collected the species at Manhattan, Topeka, Meade, Hays, Wa Keeney, Colby, and at Benkelman, Neb. There are records of its occurrence as far west as Denver.

Var. amœna Lec. This variety is not really separable from splendida in any particular but in having the full elytral markings of limbalis. About one-third of the specimens taken at Manhattan have these markings and may be placed under this name, but many intermediate varieties of marking occur. The most common form is that of Leng's new variety transversa. The latter insect is, however, described as a variety of purpurea, and as having the same color. The fact that the markings of transversa reappear both in splendida and in the closely related denverensis shows the intimate relations of the whole so-called purpurea group.

C. denverensis Casey. First taken by me at Oakley, Kan., October 28, 1901, which is also the first recorded capture in the state; however, there are specimens in the Agricultural College collection which were taken in Meade county several years earlier. I took several specimens at Meade, Kan., May 15, 1902, and in May, 1903, I found it common at Benkelman and Haigler, Neb. I found it associated with a few specimens of splendida, with which it corresponds in habits. In four cases I found denverensis and splendida in copulation, and my friend, Mr. Johnson, of the Fort Collins, Colo., Experiment Station, has observed similar cases near Denver. I have observed a few specimens that I regard as intermediate forms between the two. For example, I have a denverensis with a blue thorax. A study of the habits of the purpurea group leads me to recognize two series. The first is represented by purpurea and the varieties graminea, audubonii, cimarrona, etc. This series has usually a detached, oblique middle band. They stay mostly on nearly level, open country, along paths and on bare spots in pastures. The other series has the middle band less oblique when complete, but often short and at right angles to the border of the elytron, or even lacking. It is usually found on steeply sloping clay banks or along deeply washed gullies. To it belong limbalis, splendida, denverensis, etc.

C. formosa Say. I have taken this beautiful species at Topeka, Manhattan, Junction City, Abilene, Ellsworth, Ellis, Grainfield, Morland, Dodge City, Lakin, Medora, Meade, Belvidere, Englewood, and other Kansas places; at Limon, Wray, and Salida, Colo.; at Superior, Benkelman, and Haigler, Neb. Abundant in spring and fall. Specimens from eastern and middle Kansas are usually smaller and darker than they are farther west. I have seen no typical examples of var. generosa from Kansas, although an occasional specimen approaches it.

C. venusta Lec. This is regarded by both Mr. Leng and Doctor Horn as a distinct species and not as a variety of the preceding. While it inhabits sandy.places where the other species is also usually present, the association is never a close one, and its distribution is much more limited. I have taken specimens at Medora and Grainfield, Kan., at Limon, Colo., and at Benkelman, Neb. I found it common at Grainfield, over a limited area of grassy sand, on September 25 of the present year.

C. fulgida Say. Occurs on the salt marshes of Kansas, and wherever the alkali in the soil comes to the surface so as to make small, bare spots. On the salt marshes it prefers the border, close to the grass, in which it often seeks safety when disturbed. I have captured it at Talmo, Jamestown, Belvidere, Lakin, Englewood, and Wallace, Kan.; at Benkelman and Haigler, Neb.; at Wray, Robinson, and La Junta, Colo. It begins to be common by the middle of May and remains through June and July, while a few persist even longer. At Robinson, Colo., near Bent's Fort, I found fresh specimens, August 23, in considerable numbers. This would indicate that, as with C. pulchra, there is sometimes a fall brood.

C. vulgaris Say. Common throughout the state. A species subject to many variations in size and color. Small, bright green specimens with faint markings are found, and in western Kansas and the eastern part of Colorado a well-marked variety approaching the description of var. obliquata is taken. This has been distributed and appears in many collections as obliquata. but Doctor Horn says that it is not the true obliquata, but an undescribed variety.

C. repanda Dej. Common everywhere in Kansas that I have collected. It is very numerous in spring and fall and almost disappears in midsummer. Casey's variety unijuncta also occurs, but is so feebly differentiated from repanda that it may be disregarded, especially as specimens occur with the humeral and middle bands united on only one side.

C. duodecimguttata Dej. Taken by me at Hays and Wa Keeney, but I have seen specimens taken at Manhattan and other points in the state. Occurs in spring and fall.

C. oregona Lec. I have collected this species at Colorado Springs and Salida, Colo.; common late in the fall and early in the spring, but specimens may be found throughout the summer. This species figures in several Eastern collections as from Kansas; in one case the locality Salina is given. If it were not for this case, I would advance the theory that the specimens date back to the time when Kansas extended to the top of the Rocky Mountains, and are really from Colorado.

C. hirticollis Say. Occurs in eastern Kansas and in some parts of western Kansas, but is replaced over the greater part of the state by the variety ponderosa Thom. The two forms, however, grade into each other, so that it is often difficult to decide to which some individuals belong. The extremes differ widely in size, outline, and color. At Syracuse, Kan., I took specimens very dark in color, large in size, heavily marked, and with scarcely any pilosity. They had the outlines of typical hirticollis instead of the broadened ponderosa form. Both the species and the variety are common on wet sand-bars from May 1 to July 1, and from August 25 to November 1, or even later.

C. limbata Say. I first found this fine species at Benkelman, Neb., about three miles north of the Kansas line, on sand-hills. This was on May 18, 1903. On May 20, I found them more numerous at Wray, Colo., a few miles further west, and collected about eighty specimens. They were around the top of a sand mound which rose some 200 or 300 feet above the valley of the Republican river. On the top of the mound was a blow-out in the form of an elongated crater, composed of white sand. All around the top of the mound and extending about a hundred feet down the slopes the white sand was found, and sparse grass grew up through it. Wherever this white sand extended I found the insects, both in the blow-out and on the slopes. No other tiger-beetles were found here, but C. formosa was found to the edge of the white sand. This was the only sand-hill in the neighborhood on which limbata was found, and I found it only on one small spot at Benkelman. It is a quick flyer, but its flight is short, and it is not hard to capture.

C. cinctipennis Lec. On August 23, 1902, I captured a single specimen of this species in a sugar-beet field near Bent's Fort, Colo.; and Mr. Knaus captured one at the same place the next day. The insects were in the shade of the beet plants, on moist ground. On July 18, 1903, at Glenwood Springs, Colo., I found the species rather common, but the day was too cloudy for collecting, and the insects disappeared as soon as the sun was hidden by clouds, so that I captured only a small number.

C. punctulata Fab. Found everywhere from June 10 until November. When captured in the net, emits a strong but not disagreeable odor. Some of the other tiger-beetles emit similar odors, but none of them such a strong one as this.

C. punctulata var. micans Fab. Occurs throughout western Kansas and eastern Colorado. It does not differ from punctulata, except in color, and is usually found associated with that form. At Glenwood Springs I found specimens in which the green or blue color extended over the thorax and head. They had none of the bronzed shade seen in specimens from the plains east of the mountains. They had also much more prominent markings, in some cases a complete middle band. They seemed to be abundant, and punctulata were present with them, but much more rare. The latter had also prominent elytral markings.

C. cuprascens Lec. Common along the borders of the Kansas and Arkansas rivers. Specimens taken from Dodge City westward are more uniformly coppery bronze in color, and are more heavily marked than Topeka and Manhattan specimens. Taken during June, July, and August.

C. macra Lec. This is properly a variety of cuprascens. Mr. Leng dropped it entirely from the list, on the ground that he was unable to separate it from that species, but his action was based on material from east of the Mississippi river. An examination of material sent him from Topeka and other Kansas points convinced him that he was in error, and he will hereafter include it as a variety. This is also in accord with the views of Doctor Horn. The insect is more plentiful in eastern Kansas than cuprascens, but does not extend so far westward. It is usually without the coppery shade and more greenish in color. There is in nearly all specimens a more evident parallelism of the outer edges of the elytra, and a narrowness in proportion to the length, but the differences in the elytral apex are in some cases the only means of their determination. It has the same season as cuprascens. In addition to the river localities given, I have taken both insects on salt marshes.

C. knaussi Leng. Found on salt marshes and along the borders of alkali ponds and irrigation ditches, always on moist places. It varies much in color, after the manner of C. sperata, with which it is closely related. Doctor Horn thinks it a variety of C. nevadica Lec., a species not recently collected. I have taken bright green specimens at Englewood, Kan., and at Las Animas and Pueblo, Colo.

C. lepida Dej. Found on bare, white sand along rivers and in sand-hills. It is not common at any place in which I have collected it. Most of my specimens were taken at electric lights in Manhattan and Dodge City.

C. togata var. apicalis W. Horn. This insect is common on the salt marshes of Kansas from about May 20 to the last of August. It is a swift runner and does not rise unless closely followed. It keeps on the open, unobstructed parts of the marsh, where the surface is white and hard. I have taken it at Belvidere, Englewood, Jamestown, and Talmo. I have seen specimens that closely resemble the typical togata.

C. circumpicta Laf. Common on salt marshes and on alkali soil in western Kansas and eastern Colorado from about June 10 to the last of August, Green, blue and bronze forms occur, but the last is more common and the blue quite rare.

Of the above mentioned thirty-seven species and varieties of tiger-beetles collected by me, all but five—laurentii, cimarrona, limbata, oregona, and cinctipennis—were collected in Kansas. It is probable that cinctipennis and oregona occur in the state, and there is a possibility that limbata may also be found. Some other species and varieties are to be looked for in the state. Limbalis Klug. and lecontei Hald. have been reported as occurring, and may be not uncommon in northeastern Kansas. Other possible finds might be tetracha, carolina, C. cursitans, C. ludoviciana, and C. sperata.

C. pusilla and C. cyanella are quoted by Schaupp, Leng and others as Kansas species. It is probable that this statement had its origin in their capture at the time in which Kansas territory extended to the summit of the Rocky Mountains, and that the specimens with locality labels "Kansas" actually exist.

My experience in handling Cicindelidæ, whether of my own collecting or those collected by others, has taught me that they make the best specimens when taken from the cyanide bottle as soon as convenient after they are dead and pinned promptly. They should not be put in alcohol or formaline, as the legs and antennæ become fixed, and never again relax so as to be easily placed in proper position. In the absence of facilities for pinning, paper rolls may be used, or gelatine capsules. If the latter are used not more than one specimen should be placed in a capsule, because the confined air is not sufficient to let the insect dry, and decay sets in.